REMARKS/ARGUMENTS

12-15, 17-30 and 33 are active.

Claims 30 and 33 are amended to include the limitations of previously presented claim 1 and are now each independent claims.

No new matter is added.

The Examiner continues to maintain the obviousness rejections citing Joret or Wolfe also combined with Nadaud, Kimock or Kida. In response to the previous Office Action, Applicants defined the high refractivelayer above the functional layer to have a refractive index of 2.2-2.25 with the mixed silicone zirconium nitride at the specified ratio of 4.6-5.

Starting at page 11 of the Official Action, the Examiner continues to maintain that it would have been obvious to optimize the amounts of silicone and zirconium to achieve different refractive indices. That the motivation for doing so may differ from the present application is not a convincing factor according to the Examiner. Further, the Examiner views Wolfe's statement in column 4 regarding low intrinsic stress to be insufficient to teach away from higher levels of zirconium, as Applicants have argued, as the Examiner views this disclosure in column 4 only as a preferred option and not mandatory (see page 12 of the Official Action).

The claimed range of the layer above the siliver functional layer is 2.2 to 2.5 (see Claim 1, reproduced above).

The portion of Wolfe in col. 3, lines 1-20 which is cited in the range includes a range of 2.1 to 2.5 but that is for the first dielectric layer. However, Wolfe's second dielectric layer that is above the functional layer (upper layer) is required to be in a range of 1.98 to 2.08 (see col. 4, lines 35-36).

Applicants position is that Wolfe's teachings in col. 4 mandate a refractive index that substantively differs from the corresponding layer provided in the present claims. In

particular, Wolfe in col. 4 refers to the "above-described composition films" (which presumptively can include SiZrN films described in col. 3). However, Wolfe clearly states that when those composite films are used "**should be adjusted** so that the refractive index ranges preferably from approximately 1.98 to 2.08." Thus, the "should be adjusted" phrase is the type of disclaimer that lets one of ordinary skill know that the feature in question is required. See also, attached Rule 132 Declaration from Vincent Reymond at pages 1-2.

A particular feature of this laminate is that at least one of those layers, in particular the high refractive index layer, comprises a mixed silicon zirconium nitride having a specified ratio of the Si and Zr. According to the specification on page 8 this selection of material provided advantages contrary to what was previously known about zirconium nitride as particularly absorbent when mixed with silicon nitride. The examples in the application use zirconium silicon nitride compared to other laminates having silicon nitride (examples 1 and 2 versus 3 and 4) in which the advantages of the zirconium silicon nitride are summarized on page 18, last 2 paragraphs which discusses the prevention of color in reflection from being greatly modified as the angle of incidence varies and can undergo heat treatment without impairing the optical properties. Further comparative data demonstrating improved performance is shown in examples 6 and 7 (page 25), example 8 for solar protective performances (page 26) and the table on page 29 using aluminum zirconium nitride as comparative material.

Still further, attached is an executed Rule 132 Declaration that the Si/Zr ratio of between 4.6 and 5 yields and improvement that would not have been reasonably expected. The contents of this Declaration are discussed further below.

In the Official Action, the Examiner has rejected Claims 1, 4-11, 28 and 30 as being obvious in view of WO 01/37006 (Joret) using the U.S. equivalent, US patent number 6,924,037 combined with Wolfe, US patent number 5,563,734.

The Wolfe patent is also cited by itself (see page 5 of the Official Action) to allege that Claims 12, 13, 16 and 20-22 would have been obvious.

In the present claims (see Claims 1 and 12), the layer above the silver layer is defined as having a refractive index of about 2.20 to about 2.25. Wolfe, which is relied upon in both rejections, describes that the refractive index must be limited for the second dielectric layer (i.e., the one placed above the silver layer) where a SiZrN composite film is used. Applicants understand that the Office has already recognized this (see page 3, last paragraph and page 6, lines 3-6 of the Action) but considered this to be optimization based on Wolfe in col. 3 (lines 27-35) who discusses that the refractive index can be varied to achieve different light transmission and the data Applicants have previously provided shows that when the variance in the ratio alters the refractive index.

Applicants explained that what Wolfe describes in col. 3 does not actually give any indication that the parameter in question here (the percentage of zirconium within the high index layer is such that Si/Zr is 4.6 and 5--see Claim 1) is a result-effective variable. All that Wolfe describes is "The refractive index of the composite films will vary depending on the relative amounts of the different nitrides that comprise each film." This not an indication that the percent of Zr is a result-effective variable.

Further, the reason why Wolfe has required the second dielectric layer between 1.98 and 2.08 becomes apparent when Wolfe's teachings in col. 4, lines 38-41 are taken into consideration where Wolfe discussed that the layer should exhibit a low intrinsic stress. (See previously submitted Declaration at ¶7).

Indeed, contrary to the conclusion raised by the U.S. patent office, one would not have increased the Zr content because it was thought that increased Zr would increase the intrinsic stress, something Wolfe clearly states is not desirable. (See submitted Declaration at ¶8). Intrinsic stresses develop during the sputtering deposition of materials. These stresses are not due to lattice mismatch or thermal mismatch strains and are therefore called intrinsic stresses or growth stresses. These stresses arise because films are deposited under non-equilibrium conditions. In general, any redistribution of matter will result in film stresses, since the film is constrained by the substrate. A volume expansion of the thin film results in compressive stresses, while volume shrinkage results in tensile stresses. (See Declaration at ¶9).

The passage reproduced in the Declaration at ¶10 explains the phenomenon in more detail. Concerning the doping of Si_3N_4 with zirconium, the addition of Zr in the material leads to the increase of the compressive strength, as indicated in table 1 that gathers experimental data (See Declaration at ¶11).

While Applicants have found that increased Zr content does increase intrinsic stress as well, however, the effect was not as great as would have been expected and indeed rather limited, contrary to what Wolfe teaches. Therefore, Applicants have found that with the increased Zr content, improvements in the optical properties of the antireflective stack are achieved as explained in the previously submitted Declaration of Ms. Roche (September 24, 2008 filing) but also permit the heat treatments that are also required. That both of these features could be achieved with the increased Zr content, particularly, in view of Wolfe with or without the Joret citations, would not have been reasonably expected.

The examples in the application use zirconium silicon nitride compared to other laminates having silicon nitride (examples 1 and 2 versus 3 and 4) in which the advantages of

the zirconium silicon nitride are summarized on page 18, last 2 paragraphs which discusses the prevention of color in reflection from being greatly modified as the angle of incidence varies and can undergo heat treatment without impairing the optical properties. Further comparative data demonstrating improved performance is shown in examples 6 and 7 (page 25), example 8 for solar protective performances (page 26) and the table on page 29 using aluminum zirconium nitride as comparative material. Also previously submitted is a Declaration presenting additional information as to the importance of the ratio between 4.6 and 5.

The silicon zirconium nitride material provides improved performance as well as mechanical durability would not have been expected from what was known about the material prior to the present application.

As shown in the attached Reymond Declaration, Mr. Reymond calculated and simulated the optical and heat insulation properties of four different constructs:

(1) one without Zr,

(2) one according to the invention, i.e., having a SiZr ratio within the claimed range,

(3) one according to Wolfe's teaches as discussed above, and

(4) one with an amount of Zr exceeding the claimed range.

The details of Mr. Reymond's calculations are presented on pages 2-3 and the results demonstrated in Table 1 on page 3, with the heading row of that Table showing what the ratio's of Si/Zr.

As explained by Mr. Reymond, the results in Table 1 show clearly the unexpected advantages with connection to the use of Si3N4 doped layers with Zirconium, provided that the Si/Zr ratio remains in the range according to the instant invention. More particularly:

- it is possible to keep high level of light transmission, i.e. equal to or superior to 70% while increasing the thickness of the silver functional layers,

- the solar factor SF of the double glazing is decreased and the heat reflectance is increased, which means that the percentage of the total solar radiant factor passing through the double glazing (i.e. entering the room) is decreased,

- the selectivity of the double glazing comprising the stacking according to the instant invention is higher than those with another Si/Zr ratios (higher or lower), which means that it enables to provide sufficient light transmission while having an energy transmission as low as possible. This allows to prevent any overheating of the room in sunny weather.

In view of the totality of teachings of the cited art and the Applicants presentation of improved and unexpected results, the rejections citing Wolfe and Wolfe and Joret should not be sustained.

Combinations of certain claims are rejected combining Wolfe and Naudaud or Joret, Wolfe and Kimock or Kida for the purpose of finding limitations of those dependent claims. These references when combined with Wolfe or Joret do not remedy the core deficiencies of Wolfe and Joret as discussed above. That is, neither Joret nor Wolfe describe the arrangement of the layer having a refractive index of about 2.20 to about 2.25 in relation to the functional layer nor the advantages of this coupled with Applicants' discovery that when Si3N4:Zr is used rather than Si3N4, a good antireflective coating with a thickness of silver which can be increased (low E stack and control solar stack has a better efficiency) or with the same thickness of the silver layer. That Si3N4:Zr provided such a benefit is not suggested by the cited references when combined and indeed the attached Declaration and the previously submitted Declaration explain why one would not have modified the Si/Zr ratio

and why the advantages they have discovered are surprising and unexpected in view of the common knowledge in the art.

In view of the above, it is requested that all of the rejections under 35 USC 103(a) be withdrawn.

A Notice of Allowance is also requested.

Respectfully submitted,

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